$$\left(1-\frac{4x^2}{\pi^2}\right)\left(1-\frac{4x^2}{3^2\pi^2}\right)\ldots\ldots=1-\frac{4x^2}{\pi^2}\left[\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\right]$$

$$+\frac{4^2x^4}{\pi^4}\left[\frac{1}{3^2}+\frac{1}{3^2\ 5^2}+-\right]-\frac{4^3x^6}{\pi^6}\left[\frac{1}{3^2\ 5^2}+-\right]+\ldots$$

$$=1-c_1x^2+c_2x^4-c_3x^6+\ldots(3).$$

Comparing (1), (2), and (3),

$$1-c_1x^2+c_2x^4-c_3x^6\ldots\ldots=1-\frac{x^2}{2\ !}+\frac{x^4}{4\ !}-\frac{x^6}{6\ !}+\ldots$$

$$\text{or}\left(1-\frac{4x^2}{\pi^3}\right)\left(1-\frac{4x^2}{3^2\pi^2}\right)\ldots=1-\frac{x^2}{2\ !}+\frac{x^4}{4\ !}\ldots(4).$$

$$\text{Let } y^2=-x^2.\quad\left(1+\frac{4y^2}{\pi^2}\right)\left(1+\frac{4y^2}{3^2\pi^2}\right)\ldots=1+\frac{y^2}{2\ !}+\frac{y^4}{4\ !}+\frac{y^6}{6\ !}+\ldots(5).$$

Now, adding this exponential series, e^y and e^{-y},

$$\frac{e^y+e^{-y}}{2}=1+\frac{y^2}{2\ !}+\frac{y^4}{4\ !}+\ldots=\text{from (5)}\left(1+\frac{4y^2}{\pi}\right)\left(1+\frac{4y^2}{3^3\pi^2}\right)\ldots(6).$$

Substituting π for y in (6), we have,

$$e^{\pi}+e^{-\pi}=2[1+2^2][1+(\tfrac{2}{3})^2][1+(\tfrac{2}{5})^2]\ldots$$

PROBLEMS FOR SOLUTION.

ARITHMETIC.

132. Proposed by WILLIAM SYMMONDS, A.M., Professor of Mathematics, Santa Rosa College, Sebastopol, Cal.

A road 60 feet wide crosses a square acre of land. The west line of the road passes through the southwest corner of the land, while the east line of the former passes through the northeast corner of the latter. What fraction of the land is included in the road?

133. Proposed by COOPER D. SCHMITT, A. M., Professor of Mathematics, University of Tennessee, Knoxville, Tenn.

In Wentworth's Arithmetic he gives a formula $\frac{2}{4}\frac{1}{0}(d^2-2d)$ for calculating the number of board feet in a log 10 feet long, when d is the diameter in inches. How is this rule derived?

*** Solutions of these problems should be sent to B. F. Finkel not later than Nov. 10.